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Nursing Students' Willingness and Ability to Care in Disasters: Based on All Hazard Scenarios

Sakineh Sharifian[1,2], Batool Amini[3]*

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Abstract

Background: At the time of an emergency, nurses are one of the most important first responder groups. Thus, their readiness to deal with emergency situations will increase disaster resiliency and continuity of care. The purpose of this study was to determine if whether nursing students at Iran University of Medical Sciences were willing and capable of providing care in a disaster or an emergency circumstance based on their disaster training courses.

Methods: This was a cross-sectional study conducted during 2017 and 2018 in Iran University of Medical Sciences, Iran. Using a simple random sample procedure, 110 nursing students who passed disaster-related courses as part of their degree program (senior year students) were included in this study. Data were collected using the Disaster Survey questionnaire, developed by Qureshi (2005). The questionnaire consists of 8 disaster scenarios and 11 questions. Reliability testing was done using Cronbach's alpha (8). Scenarios were adapted to the context. Data were analyzed using SPSS 23 and descriptive statistics.

Results: The response rate was 93%. Participants' mean age was 21 years. The highest score in the ability to care (61%) was related to explosion incidents and the lowest score inability (22.9%) was related to radioactive incidents. The highest score of willingness to care (63.5%) in students was related to scenario 4 (explosion incident). The lowest score of willingness to care (32.7%) was for scenario 7 (radioactive bomb explosion) and scenario 2 (infectious disease).

Conclusion: This study showed that nursing students do not have enough willingness and ability to provide care in radioactive and biological emergencies. There were some shortcomings in nursing education courses, especially in content related to radioactive and biological events.

Keywords: Willingness to Care, Ability to Care, Scenario, Disaster, Students, Evaluation, Incident

Conflicts of Interest: None declared
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Introduction

Past experience and the literature have shown that natural or manmade events turned into disasters when societies do not have enough knowledge and preparedness about hazards. Disasters affect all aspects of human life and destroy the basic infrastructure of societies and systems (1). because of the unexpected nature of disasters, it is not possible to evaluate the training during the response phase, except during maneuvers (2). Therefore, using different scenarios to evaluate the training and giving feedback seems appropriate (3). Scenarios play an important role in the evaluation of students' professional and behavioral skills (4, 5).

Corresponding author: Dr Batool Amini, amini.b@iums.ac.ir

1. Nursing Care Research Center, Iran University of Medical Sciences, Tehran, Iran
2. Department of Nursing Management, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran
3. Medical Education Research Center, Medical Faculty, Iran University of Medical Sciences, Tehran, Iran

↑What is "already known" in this topic:
Nursing students do not have enough willingness and ability to provide care in radioactive and biological emergencies.

→What this article adds:
There were some shortcomings in nursing education courses related to disaster especially in content related to radioactive and biological events. According to the findings of this study, it is critical to modify and improve the contents of the nursing course.

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Most evidence regarding disaster education is based on reports and lessons learned and subjective criteria. Despite efforts to develop standard tools and methods for evaluating disaster education, evidence-based planning and training are needed to improve the effectiveness of disaster responses (6).

Disasters are phenomena that may not require special knowledge, but they require specialized training and coordinated efforts between all health care providers. In all disasters, there is a need to increase the number of care providers to work together in a coordinated and effective manner (7).

Nurses are the largest group of health care providers, and often called as one of the first health care providers in disaster response. Patient care, education, mental health consultation, and triage management are among nurses' responsibilities as first responders (8). Thus, their preparedness in disaster management will increase the system resilience and continuity of care (9).

In Iran, a bachelor's degree in nursing takes four years to complete. In this degree program, students have theoretical and clinical courses. Their clinical works start from the second term. Undergraduate nursing students have one theoretical course and one internship course related to disaster management, and assessment of these courses is not based on students' learning outcome (10). The aim of this study was to determine the willingness and ability of nursing students in Iran University of Medical Sciences to provide care in a disaster or emergency situation regarding their disaster educational course.

Methods

This was a cross-sectional study and conducted during 2017 and 2018 in Iran. Iran is a country located in Western Asia with 31 provinces. In each province, there is at least 1 medical science university. Iran University of Medical Sciences' nursing program has been in place for over 40 years and offers bachelor's through doctoral degrees. In undergraduate nursing curriculum, there is one theoretical course related to disaster education, entitled "nursing in disasters and emergencies," which is presented in 17 sessions in the sixth semester. There are 2 practical courses in the seventh and eighth semesters in disaster education. A total of 110 nursing students in Iran University of Medical Sciences who passed courses related to disaster on their degree program (senior year students) were included in this study using a simple random sampling method.

Data collection was done through the Disaster Survey questionnaire, developed by Qureshi (11). By sending an email to the questionnaire's creator, researchers received written authorization to use the questionnaire. The questionnaire was translated by an expert translator then back-translated by another translator who was familiar with the nursing education. The questionnaire consisted of 8 emergency scenarios and 11 questions with a 3-part (Likert type) scale, including "able/willing, unable/unwilling, and unsure." Researchers sent the disaster scenarios to 5 experts with disaster and emergency experience as well as nursing science and experience, including university professors and managers in disaster and emergency whose primary specialty was nursing, and received feedback. To evaluate the face and content validity, the questionnaire was sent to 7 experts in disaster and nursing management. Opinions were reviewed and applied in an expert panel consisting of 6 disaster management and nursing experts. To confirm the reliability, the questionnaire was given to 20 senior nursing students who have passed the courses; and 1 week later, the questionnaires were given to them again (test-retest). The value of Cronbach's alpha was.8. The Cochrane test was used to choose the sample, and the sample size was set at 80, but 110 nursing students were chosen using simple random sampling to avoid response rate issues. An investigator (B.A.) who was familiar with the quantitative study and also the aim of the study conducted the data collection. Data were analyzed using SPSS 23 and descriptive statistics. The chi-square test and the exact Fisher test were used to investigate the relationship between training and willingness and ability to care. Table 1 shows the scenarios adopted by the research team according to type of incident.

Results

Out of 110 distributed questionnaires, 102 completed questionnaires (93% response rate) were collected. The mean age of respondents was 21 years (range, 20-27 years). About 38% of the total participants were men and 62% were women. Regarding marital status, 88% were single and 12% were married.

When asked to rate the appropriateness and sufficiency of nuclear, biological, and chemical (NBC) training in

Table 1. Disaster Scenarios Based on the Type of Incident

Nnumber	Type of Event	Scenario
1	Meteorological	Storm and snow with height of 50 cm in a day, where you live
2	Biologic	An infectious disease outbreak in a province where you live and 200 patients admitted to 5 hospitals
3	Chemical terrorism	Chemical attack at a subway station with 500 victims which brought to hospitals around the city and province
4	Mass casualty incident	Explosion at The Azadi stadium with 2000 injured brought to hospitals in the city
5	Mass casualty incident	Fire in landfill site near the hospital where you work, with 1000 people likely to exposure to smoke inhalation while wind is blowing toward the neighborhood playground
6	geophysical	Earthquake with magnitude of 6 in your city. Thousands of people flock to the hospital. ED in your hospital has some fraction in the walls and should be evacuated.
7	Radiation terrorism	Explosion of radioactive bomb at the emporium and Thousands of people flocking to the emergency departments
8	Hydrological	A flood occurrence where you live, entrance of 20 injured people in your hospital and almost all roads are closed and there is just one route to the hospital with heavy traffic.

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Table 2. Percentage of NBC Training Course Based on Participants' Perspectives

Event education	Not at all	Slightly	Moderately	Highly	Total
Chemical event	28.4	40.2	25.5	5.9	100
Bioterrorism event	49	38	13	0	100
Radiological event	23	41	31	5	100

Table 3. Percentage of Students' Ability to Care by Scenario

Scenario	Able %	Not Able %	Not Sure %
Storm and snow	37.5	16.7	45.8
Infectious disease outbreak	32.6	28.4	38.9
Chemical attack	37.6	21.5	40.9
Explosion	61.1	15.8	23.2
Fire in landfill site	32.0	31.0	37.0
Earthquake	48.0	20.4	31.6
Explosion of radioactive bomb	22.9	36.5	40.6
Flood occurrence	43	27	30

Table 4. Percentage of Students' Willingness to Care by Scenario

Scenario	Willing %	Not Willing %	Not Sure %
Storm and snow	48.0	21.0	31.0
Infectious disease outbreak	32.6	44.2	23.2
Chemical attack	48.5	26.8	24.7
Explosion	63.5	24.0	12.5
Fire in landfill site	46.5	27.3	26.3
Earthquake	56.7	28.9	14.4
Explosion of radioactive bomb	32.7	36.7	30.6
Flood	56.7	21.6	21.6

terms of student attitudes, 68% chose low or no training, while only 6% thought the level of training was acceptable and sufficient. Also, 87% of the participants stated that they did not receive no or very limited training course on bioterrorism. Furthermore, 64% of participants said the amount of radiological training was insufficient and below the moderate level (Table 2).

According to Table 3, the highest ability (61%) to provide care was related to the explosion incident, which is a type of mass casualty incident (MCI) and the lowest ability (22.9%) was related to scenario 7 (radioactive bomb explosion).

According to Table 4, the highest willingness to provide care (63.5%) was related to scenario 4 (explosion incident) and the lowest willingness (32.7%) to Scenario 7 (radioactive bomb explosion) and Scenario 2 (prevalence of infectious disease), with a mean of 32.6%.

In Figures 1 and 2, the ability and willingness of stu-

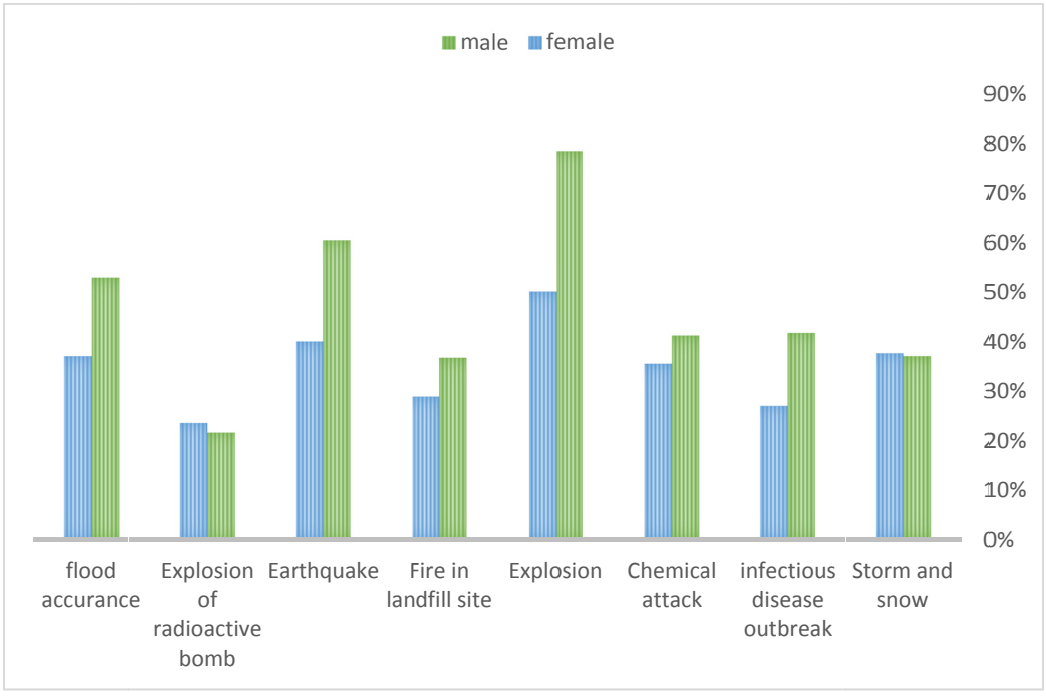

Fig. 1. Percentage of ability to care by gender based on scenarios

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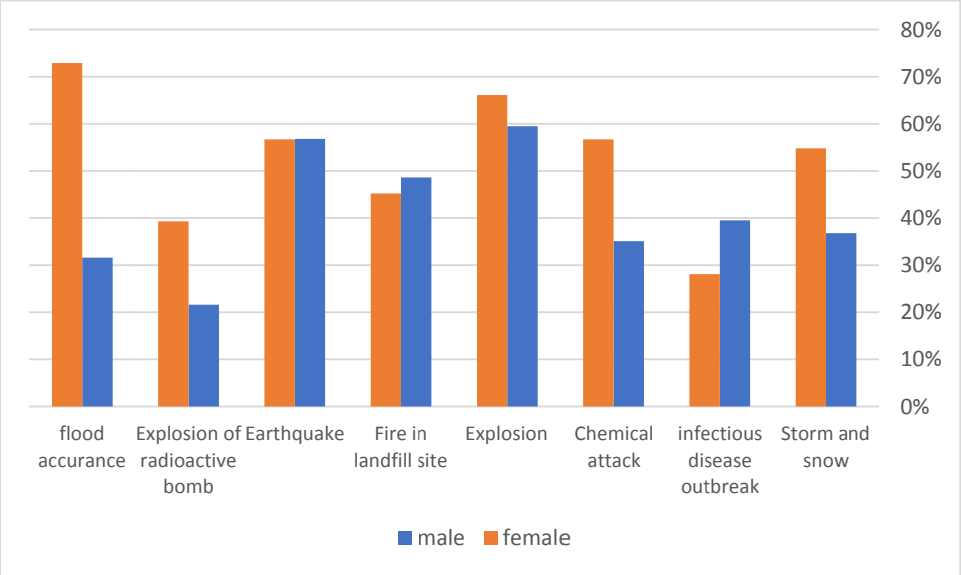

Fig. 2. Percentage of willingness to care by gender based on scenarios

dents to response in each of the scenarios are determined based on gender, respectively. Male students had greater ability than female students in the majority of scenarios, but female students had greater or equal motivation to care in the majority of cases.

The sense of responsibility, altruism, and professional ethics, respectively, have received the highest scores among students with regard to motivating them to respond to victims of bioterrorism events (Fig. 3).

Lack of education and family care commitments were the most common reasons for the inability to give care in NBC events, according to respondents (Fig. 4).

About 85% of those willing to provide care in an MCI incident said they would prefer to do it in the same hospital where they worked (58%).

Relation of the Trainings With Willingness to Care in Related Scenarios

Among respondents, there was a significant association between the effectiveness of related training and willingness to provide care in a chemical terrorist attack (P=0.003) and a fire event and smoke exposure (P=0.006). Also, there was a significant relationship between the effectiveness of related training and the ability to provide care in chemical terrorist attacks (P=0.000) and fire event and exposure to smoke (P=0.013) among respondents. There was no significant relationship between the effectiveness of related training and the willingness and ability to provide care in biological and radiological events (Table 5).

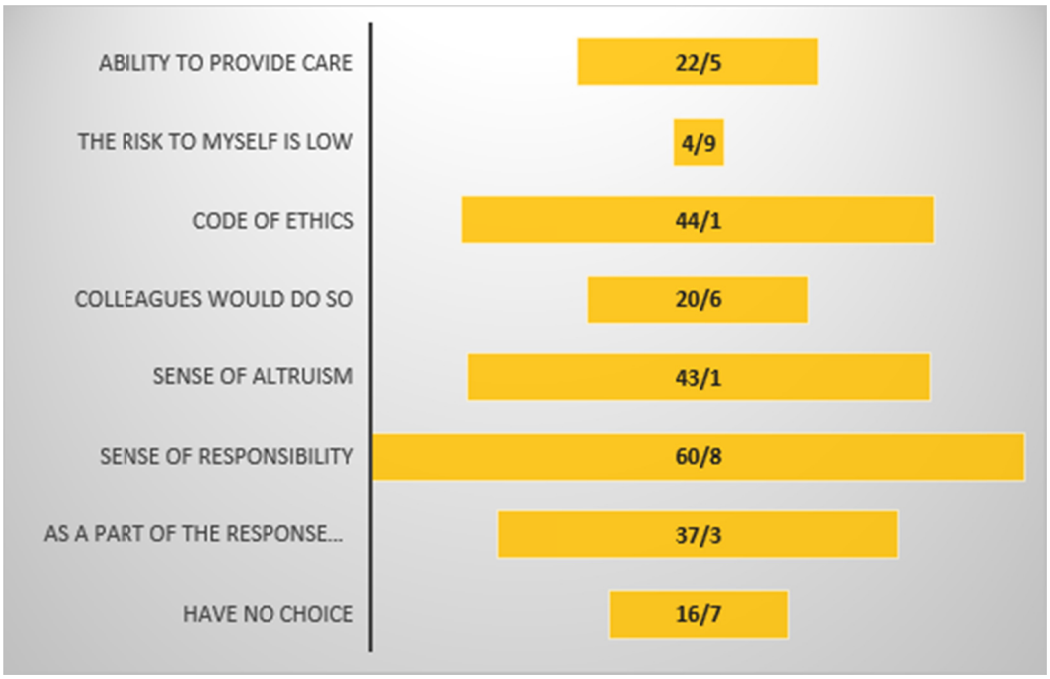

Fig. 3. Frequency of motivation to response in bioterrorism incidents

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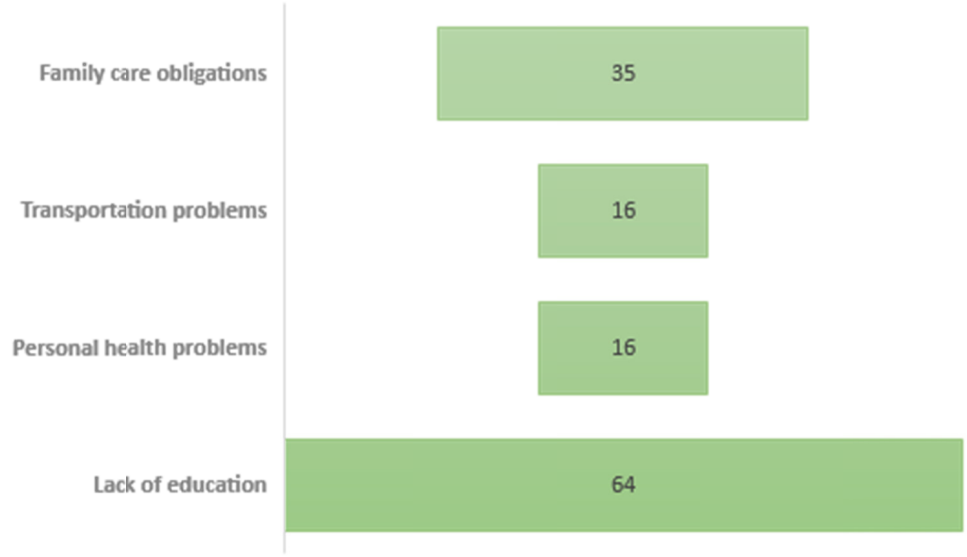

Fig. 4. Percentage of inability to care in NBC incidents

Table 5. Relationship Between the Trainings and Willingness and Ability to Care According to the Related Scenarios

Education	Scenario	Ability P Value	Willingness P Value
Chemical event education	Chemical attack	0.000	0.003
	Fire in landfill site	0.013	0.006
Bioterrorism event education	infectious disease outbreak	0.073	0.069
Radiological event education	Explosion of radioactive bomb	0.344	0.593

Discussion

To our knowledge, this was the first study in Iran to use a scenario-based approach to assess nursing students' willingness and competence to care in order to evaluate the effectiveness of their training course. According to this study, the amount of bioterrorism and chemical event education supplied in the training course was insufficient for the students. Students were more able and willing to provide care in explosion scenarios, such as when a hospital is confronted with MCI, according to one study, whereas in other studies, students were more capable of providing care in earthquake conditions (12, 13). One of the reasons for the hesitation to respond in an earthquake occurrence, according to some studies, was the obligation to care for children (11, 13). One of the most important reasons for the students' inability and unwillingness to care was a lack of specific training, according to this study. While it was one of the factors that lowered the desire to respond in Charney's study, it was also one of the factors that reduced the willingness to respond in other studies (13).

It seems that the training provided to students in the courses, in cases of mass casualties, is sufficient because the triage system of patients is included in the course syllabi. This study showed that the amount of training related to biological, nuclear, and chemical events was below average, according to the students' point of view. Therefore, it affected the ability to care during these incidents. According to the students' perspectives, the more specialized instruction received, the greater the likelihood of increasing motivation and ability. Also, the literature showed that if adequate training is given to staff and their families about self-care, it will affect staff willingness to provide care (14, 15). Other studies emphasize that lack of health protocols and inadequate training and practices are related to the staff absenteeism and unwillingness to care in disaster situation (16, 17).

Only in chemical accidents was there a significant relationship between training and the ability and willingness to care identified in NBC disasters, but not in biological or radiological occurrences. This can because of lack of proper hospital infrastructure and personal protective equipment. Other studies have found that in recent years, a shortage of workforce in hospitals during disasters has regularly resulted in new disease outbreaks (18), and that staff cited the assurance of a safe workplace and environment as one of the factors that increase motivation and willingness to care in disasters (19-21).

According to this study, the amount of NBC training for nursing students is not sufficient even it is included in their training course content. As a result, evaluating the efficiency of courses connected to this issue is challenging due to the scarcity of research on how to measure the effectiveness of disaster training (22). Furthermore, due to the emotional nature of disasters, numerous courses were formed at intervals following a disaster and then stopped with no assessment.

Conclusion

This study showed that nursing studentd do not have enough willingness and ability to provide care in radioactive and biological emergencies. There were some shortcomings in nursing education courses, especially in con-

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tents related to radioactive and biological events. Thus, it is important to revise and improve the course contents according to the finding of this study. Also, it is suggested that, in addition to improving the quality of nursing education programs, a competency-based education be introduced into the curriculum of health-related courses.

Interprofessional learning has shown its effectiveness in increasing and promoting the learning outcome in health care students. Also, several studies have been conducted in Iran that show the motivation and readiness of students in interprofessional learning (23, 24). Interprofessional education and maneuvers for health care students should be held to assess the success of the training sessions. However, there are some limitations in this study. One of them is that the researchers only studied nursing students, and because of the differences between nursing and medical education, the findings cannot be applied to students in other disciplines, however, nursing education programs are nearly the same as in other universities in Iran. There was multiple research on willingness to help in a crisis in various health-related groups, but only a few studies were conducted on nursing students. The authors suggest that researchers implement the study at the national level with a large sample size to confirm the result of this study.

Ethical Approval

This study was done in accordance with the national ethical guideline for medical research and approved by the research ethic committee of Iran University of Medical Sciences with the ethic code of IR.IUMS.REC.1394.26653.

During the data gathering, the purpose of the research was explained and the consent to participate in study was received. Respondents' names were confidential and numerical codes were used instead. Participation in the study was optional.

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Conflict of Interests

The authors declare that they have no competing interests.

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